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ABSTRACT

A project is described which can be used in geography classes on the college level to help students understand modernization in Latin America. The project is based on a demographic transition model--a model which demonstrates changes in birth and death rates as societies become increasingly industrialized and urbanized, and which also helps to organize a number of related development processes into a more understandable pattern. Specific objectives of the project are to help students understand the processes of development through a study of population dynamics, provide a clearer understanding of correlation and spatial relationships, introduce several techniques used to determine the relationships between variables, and to introduce basic research procedures. The use of this project in class is preceeded by a series of lectures on population characteristics of development, including discussion of the demographic transition model. Project data are taken from sheets published annually by the Population Reference Bureau listing socio-demographic variables for Latin American nations. The procedure is to direct students to compare and prepare hypotheses regarding birth rates, urban population, various health features of the population, changing roles of women and the family within the modernization process, and the changing structure of disease and mortality. In upper level classes, Spearman's Rank Correlation Coefficient is used to assess more exactly the strength of the relationship between two variables. The conclusion is that the demographic transition model can be used as a framework to develop projects which help students understand societies at different stages of transition. (DB)

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A CLASS EXERCISE ILLUSTRATING THE IMPLICATIONS OF THE
DEMOGRAPHIC TRANSITION IN MIDDLE AND SOUTH AMERICA.

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A thorough understanding of the complex changes that take place within societies that are rapidly developing, or modernizing, is central to cultural studies of Middle America (defined here as those countries from Mexico to Panama) and South America. The demographic transition model demonstrates not only changes in birth and death rates as societies become increasingly industrialized and urbanized, but it also helps to organize a number of related processes into a more understandable whole. To gain maximum benefits from this model, a great amount of time must be spent tracing and elaborating these various ties. Unfortunately, because of the great variety of relationships, I have frequently passed-over the entire discussion quickly, in order not to become mired in details. This is unfortunate because societies at different stages of this transition, such as those of Latin America, produce clear spatial patterns, which, if fully appreciated, can provide a clearer understanding of what "modernization" and "development" imply.

The class exercise outlined here provides a framework for studying modernization by examining certain relationships inherent in the demographic transition model. It also furnishes a practical mode for discussing the meaning of "correlation", and for introducing a number of methods of determining the strength of relationships. The specific objectives of this project are:

1. To better understand the impact of the development process on a society by studying its population dynamics, i.e. birth

- rates, death rates, population growth rates and so forth.
2. To study the variation of these features throughout Middle and South America.
 3. To understand more clearly the meaning of correlation and spatial relationships, as well as the various forms such relationships can take.
 4. To provide a practical introduction to several techniques used to determine the relationships between variables.
 5. To introduce basic research procedures.

Basic Concepts

Many sources exist that describe the demographic transition model (1,2). Essentially, the model displays the shifts in birth and death rates that have historically accompanied the Industrial Revolution (Figure 1). The initial High Stationary phase represents a pre-industrial, traditional society with high birth and death rates. With modernization, death rates begin to drop due to improved nutrition, health care, and public services. For a period of time, birth rates remain high, and as a result of this high birth rate - low death rate association, rapid population growth prevails throughout the Early and Late Expanding phases. That death rates decline prior to birth rates is indicative of the relative ease of introducing innovations that will save lives within a family-centered, traditional society. Innovations that will limit family size are more difficult to accept.

But, as industrialization and urbanization continue, birth rates gradually decline and converge with death rates at relatively low levels. The processes responsible for these demographic changes involve a complete realignment of the social and technical bases of a society, including shifts from: rural to urban settings, primary to secondary employment, extended to nuclear family ties, highest death rates occurring among children due to infectious diseases to older persons due to chronic diseases.

The Class Project

I have used this project in introductory cultural geography and in the geography of Latin America. Although more conceptual depth can be examined with more advanced students, a more important constraint in the use of this exercise is the amount of time available, and the number of themes stressed in the course. The use of the project is preceded by a series of lectures on population characteristics of development, including a discussion of the demographic transition. Also, the class is introduced to the use of maps and scattergrams as indicators of the existence and form of correlations between two variables. (Figure 2).

The Data

The data needed for this exercise are readily available from the Population Reference Bureau (PRB), and can be purchased by or

provided to the students at minimal costs (3). These data sheets list 14 socio-demographic variables for almost all countries, and are updated annually. Each time I have used this project, I have selected different combinations of the following variables:

1. Birth Rates
2. Death Rates
3. Natural Increase
4. Doubling Time
5. Infant Mortality Rate
6. Percent Population Under 15 Years
7. Life Expectancy
8. Percent Urban Population
9. Per Capita Gross National Product (GNP)

For each project, I have selected combinations that provide examples of both positive and negative relationships.

Procedure

A class handout is used to describe the components of the exercise and the steps that the students are to follow (Figure 3). In this particular instance, the student must extract from the PRB data sheet the following variables for each of the nineteen countries in the study area for which data are available:

1. Birth Rate
2. Infant Mortality Rate
3. Percent Urban Population
4. Per Capita GNP

First Comparison

Having been introduced to the use of maps, scattergrams, and the implications of the demographic transition, the student is asked to:

1. Form a hypothesis regarding the relationship between birth rate and the percent urban population, and to justify this hypothesis with two or three sentences of explanation. In forming this hypothesis, the student must think about the influence of each each variable, and how they affect one another in terms of causation.
2. Then, dividing the two variables into three categories of approximately equal size, the students construct a choropleth map showing the incidence of each of the variables, and compare the results to determine if the hypothesized relationship is valid (Figures 4 and 5).
3. To provide a means of checking the relationship between these variables, a scattergram is constructed and examined (Figure 6). In class discussions later, these two techniques can be compared on the basis of type and clarity of information provided.

Second Comparison

The steps outlined above are repeated using percent urban

population and per capita GNP. Per capita GNP is selected as an indicator of productivity, thus a surrogate of industrialization and technologic development. An hypothesis is formed, justified, and maps and scattergrams are constructed for justification (Figures 5, 7, and 8).

Third Comparison

A final comparison provides the opportunity to examine the relationship between urbanization and health features of the population. In this step the validity of the beliefs regarding average life expectancies can be checked. To lessen the work involved, only a scattergram is requested in verifying the hypothesis (Figure 9).

Concluding Remarks

In upper level classes this exploratory process has been extended by the introduction and use of Spearman's Rank Correlation Coefficient, which permits an exact assessment of the strength of the relationship between two variables. These coefficients can then be compared with calculations for other sets of variables to demonstrate the relative strength of ties.

Where time permits, additional topics can be introduced:

1. The changing role of women within the modernization process (4).
2. The changing structure of disease and mortality (5).
3. The changing role of the family (6).

4. Patterns of Migration (7).
5. Shifting occupational structures and the changing role of cities (8,9).

Lastly, questions have been raised regarding whether the validity of the demographic transition model for today's less developed countries remains as strong as in the past, e.g. the population density of Europe was far less in the nineteenth century than that of India or Egypt today, and there existed resource frontiers to which Europe could export its surplus population. These changed circumstances shouldn't be ignored, but should be used to provide additional insights into the central processes being examined. Regardless, the relationships described by the demographic transition model remain strong, and quite useful for the pedagogical purposes of this project.

FIGURE 1
THE DEMOGRAPHIC TRANSITION

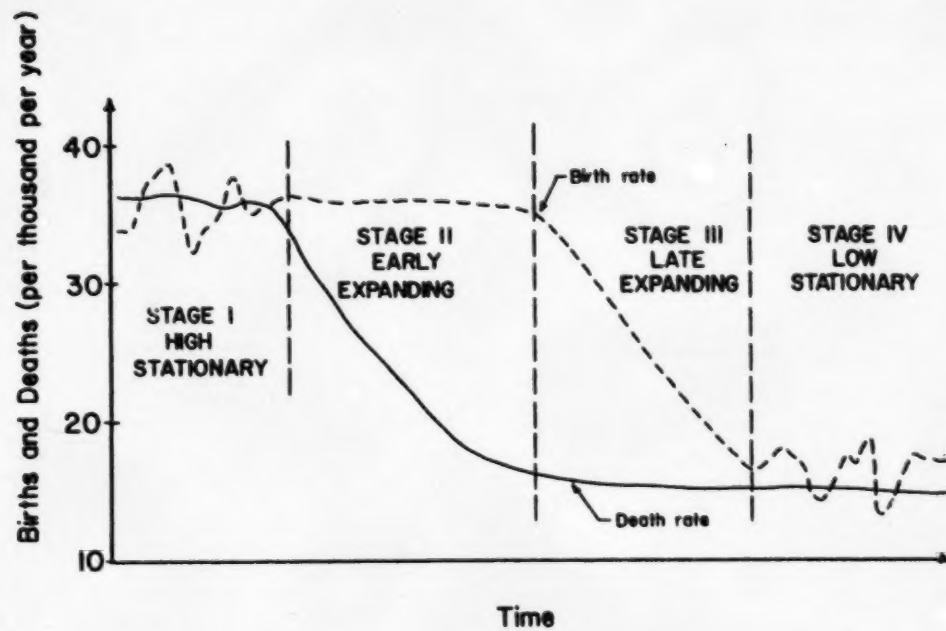
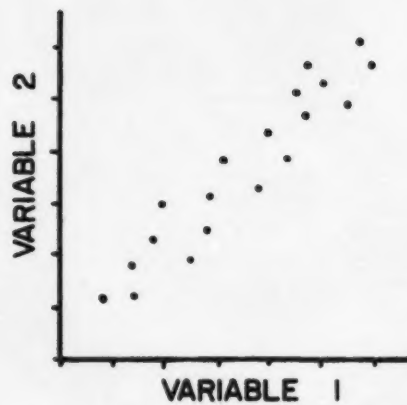
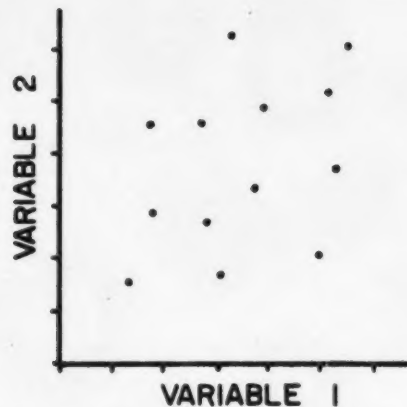


FIGURE 2

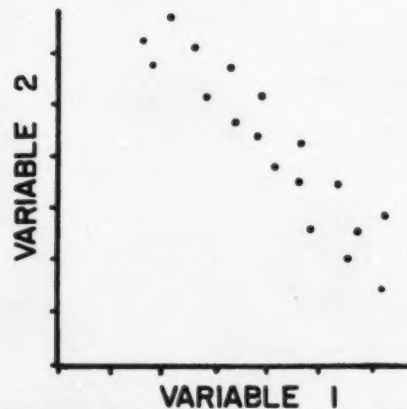
TYPES OF RELATIONSHIPS
BETWEEN TWO VARIABLES



STRONG POSITIVE RELATIONSHIP



NO RELATIONSHIP



STRONG NEGATIVE RELATIONSHIP

FIGURE 3

Cultural Geography

Practical Exercise: The Demographic Transition in Middle and South America

I. Objectives

1. To gain experience in the use of demographic data, and to better understand the relationships they reveal.
2. To become more familiar with selected spatial characteristics within Middle and South America.

II. Materials Needed:

1. World Population Data Sheet
2. Graph paper and colored pencils
3. Outline maps of Middle and South America

III. Procedure:

1. For the 19 countries of Middle and South America for which data is provided, record the values for the following variables.
 - a. Birth Rate of Country
 - b. Infant Mortality Rate
 - c. Percent Urban Population
 - d. Per Capita GNP
2. a. From the information provided in the text and class discussions, form an hypothesis regarding the relationship between a country's Birth Rate and its Percent Urban Population.

Justify this hypothesis.

 - b. Divide each of the variables into 3 categories of approximately equal size, then take two outline maps of the study area and construct a map showing the distribution of each of these variables.
 - c. Compare the maps. How do the values for each variable conform to one another.

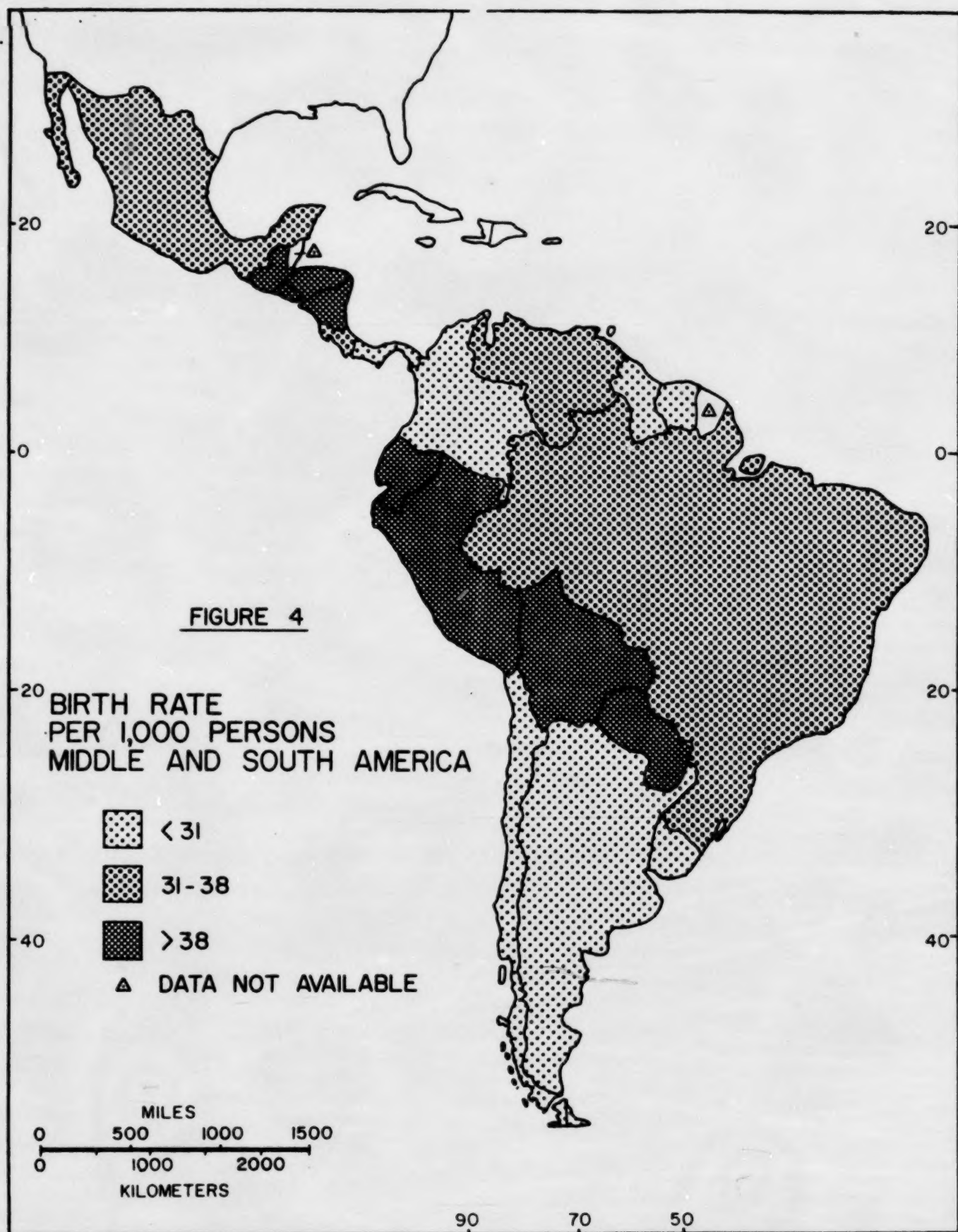
How does this affect your original hypothesis.
 - d. Construct a scattergram of these two variables, with Birth Rate along the vertical axis and Percent Urban Population along the horizontal axis.
3. Using Percent Urban Population and Per Capita GNP repeat the steps above.

In addition: How does the relationship between these variables differ from the first set?

Do you understand how strong correlations can exist between variables -- in both positive and negative directions?

4. Compare Infant Mortality Rates and Percent Urban Population using a scattergram, and justify why this relationship exists.

NOTE: Be prepared on the day this project is due to discuss the results of this project and the relative effectiveness of the methods used.



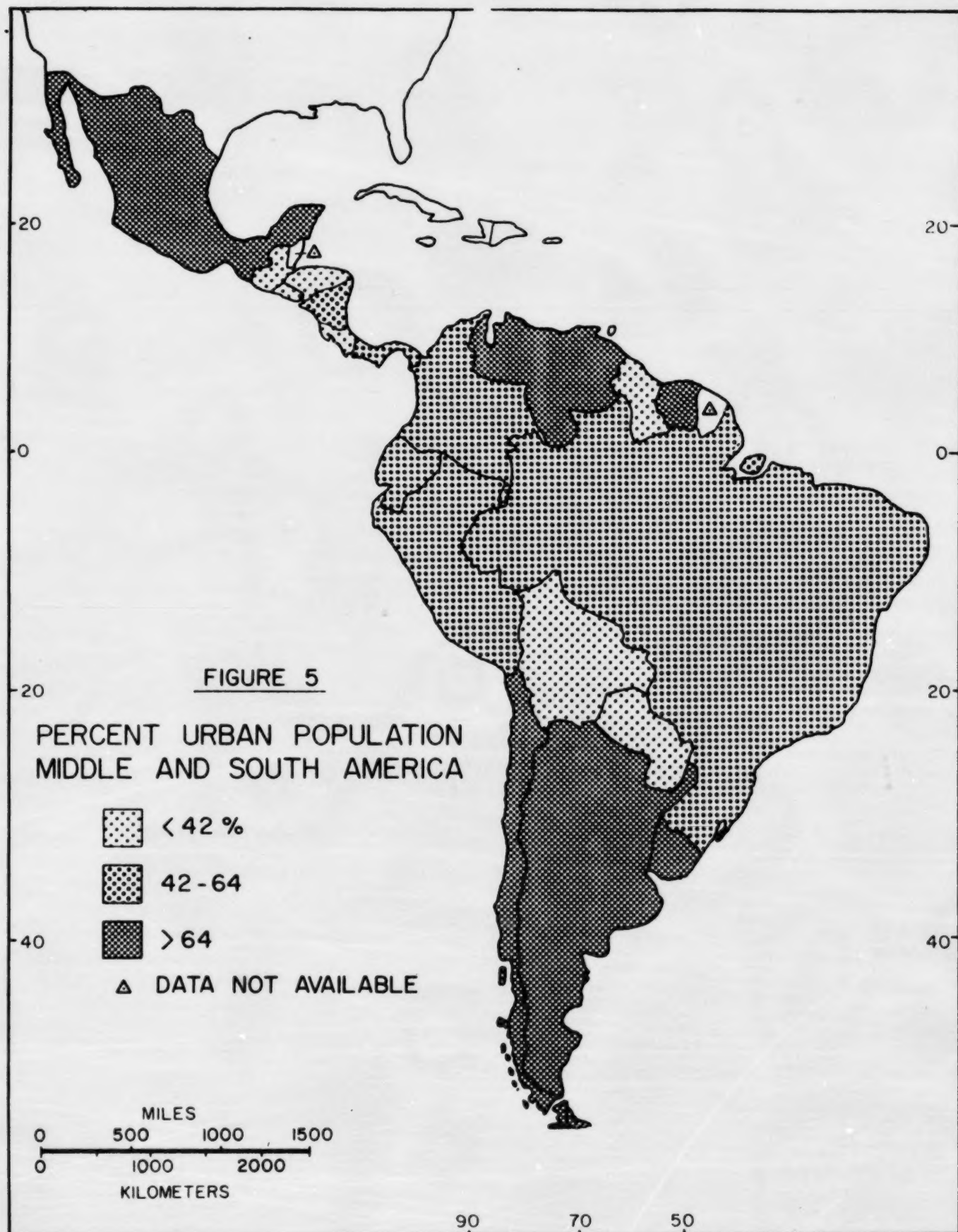


FIGURE 6

COMPARISON OF BIRTH RATE
AND PERCENT URBAN POPULATION
FOR MIDDLE AND SOUTH AMERICA

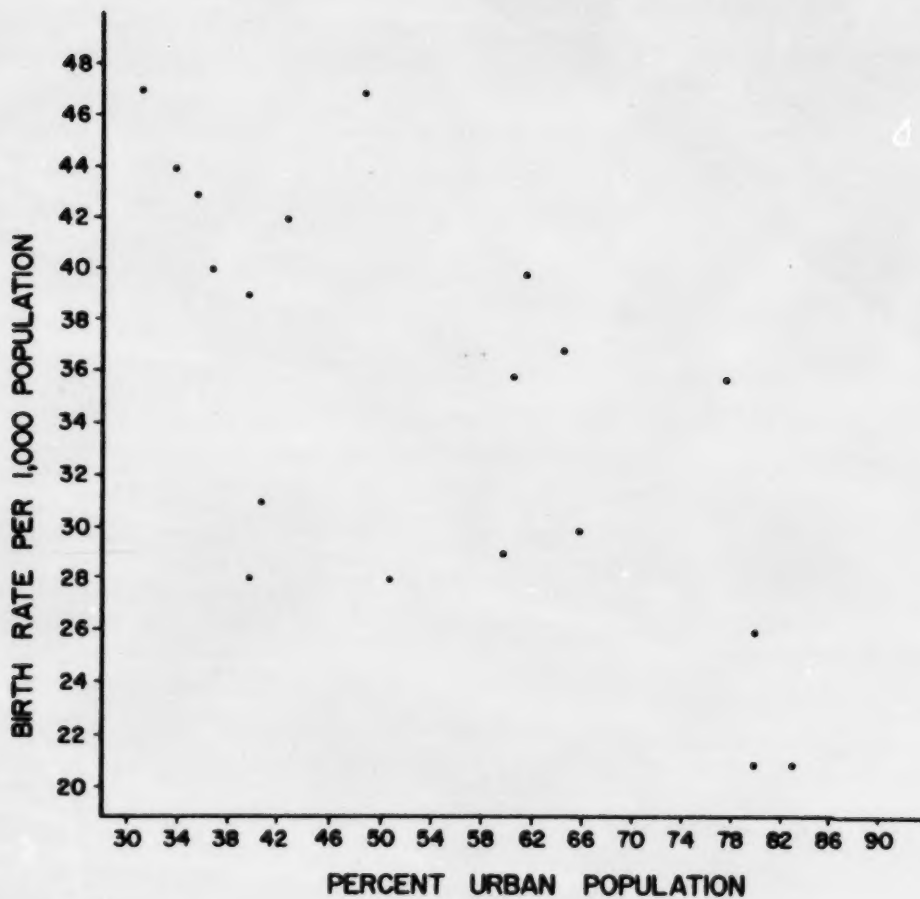




FIGURE 8

COMPARISON OF PER CAPITA
GROSS NATIONAL PRODUCT (U.S.\$)
AND PERCENT URBAN POPULATION
FOR MIDDLE AND SOUTH AMERICA

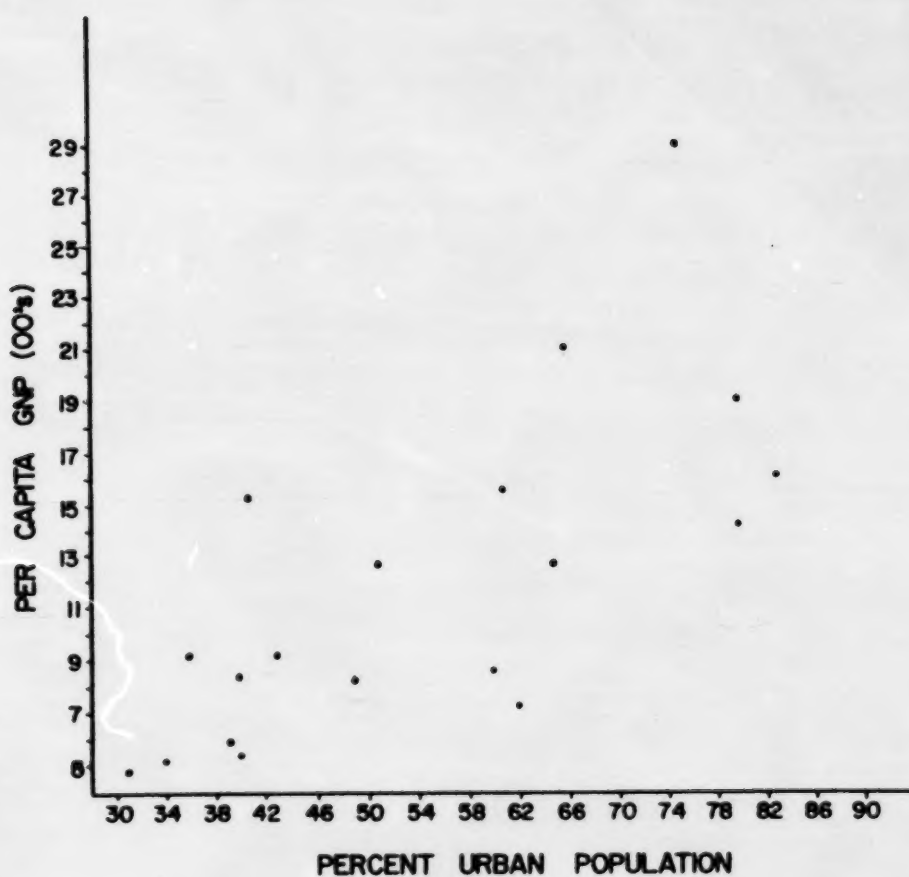
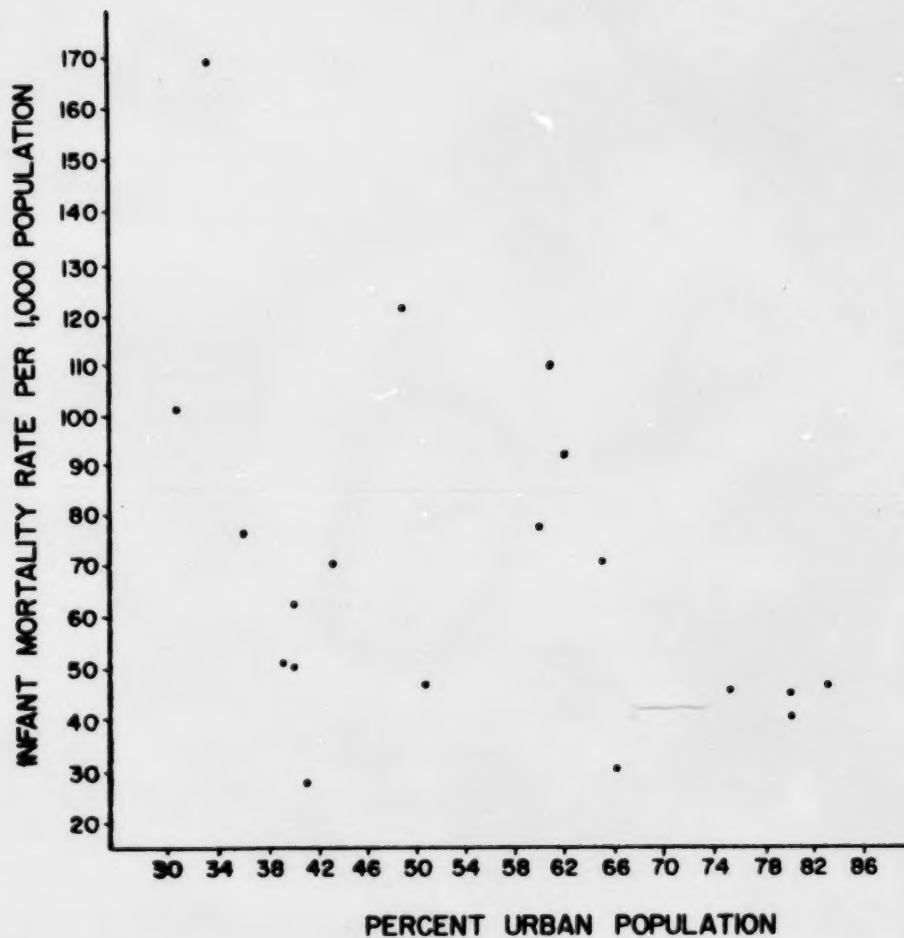


FIGURE 9

COMPARISON OF INFANT MORTALITY
AND PERCENT URBAN POPULATION
FOR MIDDLE AND SOUTH AMERICA



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